Remarks

In the Office action of July 5, 2001, the application was identified as having a generic claim 1 and two distinct species in claims 2-35 and 36-51, respectively. Restriction to one of the species was required. Applicant confirms the previous telephone election of claims 1-35 and the withdrawal from further consideration of non-elected claims 36-51, without traverse. Claims 36-51 do not (and will not) contain all of the limitations of "generic" claim 1, and so would not be entitled to reinstatement upon allowance of claim 1 (37 C.F.R. § 1.141). Accordingly, claims 36-51 are cancelled from the application, subject to the right to present them in a divisional application.

The abstract of the disclosure (on page 96 of the specification) was objected to because its length exceeds 150 words. Applicant amends this section of the application to provide a substitute abstract meeting the requirement.

The disclosure was objected to because the brief summary and description should be confined to the invention to which claims are directed. (37 C.F.R. § 1.71, 1.73, and MPEP 1302.01). Correction is required. A review of the SUMMARY OF THE INVENTION section (page 4, line 18 - page 5, line 32) reveals that the portion on page 5, lines 9-29 corresponds to the cancelled non-elected matter. The remainder of that section is commensurate with the invention as claimed (37 C.F.R. § 1.73). Accordingly, Applicant amends that section to delete the description corresponding to the cancelled matter. The remainder of the specification is asserted to be needed for a full, enabling description of the preferred embodiment of the invention claimed. Those portions of the description that do not directly correspond to the specific improvement relate to parts that necessarily cooperate with it or are necessary for a complete understanding of it, including how to make or use the invention. If the Examiner insists that some

particular portion of the specification is not germane, an identification of that portion should be clearly identified in writing and the technical and legal grounds for insisting upon its removal in the next Office action.

Claims 1-35 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Brinkman et al. (U.S. Patent No. 6,167,169).

Upon reviewing the cited patent, Applicant is convinced that Brinkman et al. do not teach or suggest Applicant's claimed invention. Brinkman et al. describe architecture for a flat panel display apparatus and a corresponding method for selectively diverting optical energy through a series of electro-optic switches (of various disclosed embodiments) to specified pixels of the display. To the extent that the switches (also referred to as "optical energy diverting devices") on modifying the effective refractive index of one or more waveguide segments, or of a coupling region between two waveguides, to effect the diverting action thereof, the index modification is necessarily temporary, since the display's pixel values will need to change with each displayed page or image.

None of the disclosure in Brinkman et al., including any of those passages cited in the Office action, appears to relate at all to the permanent adjustments provided by Applicant's claimed method. For example, the cited column 17, lines 20-38 refers, not to modifying the refractive index, but rather to creation of ferroelectric domains of alternate poles by means of domain-inversion techniques. In the cited column 24, line 55 to column 24, line 14, the description involves a coupler with intersecting waveguides and a grating disposed at an angle to both waveguides in the intersection region. It does not relate in any way to the resonant cavity of a laser device. Moreover, the reference in this section to refractive index merely specifies that the peak index change (core versus cladding) in the intersection region should be equal to the

peak index change in the waveguides and states that this can be accomplished if the tee structure is fabricated in one step (e.g. by indiffusion, ion exchange or etching). It does not disclose modifying the refractive index of an already formed waveguide segment, nor doing such modifying for a waveguide segment that is an intracavity segment in a laser, nor doing it during operation of the laser and monitoring the optical output. The cited column 33, lines 28-65 refers to temporarily adjusting the refractive index under a grating by using electric field sensitive materials, thereby enabling tuning of the grating. It does not relate to the present claimed permanent modification of the refractive index of an intracavity waveguide of a laser. In the cited column 45, line 59 to column 46, line 4, an electrode is likewise used to temporarily adjust the optical path length in any of the devices of Figs. 26-28 to tune the selected frequency to a desired channel. A wide spectrum device can be achieved as in Figs. 20-22 by using a pair of tunable gratings having slightly different spacings between adjacent transmissive peaks. In the cited column 60, line 61 to column 61, line 12, the micromirrors 976 and 977 of Fig. 36 can be fabricated by removing substrate material using laser ablation. That disclosure does not relate to ablating intracavity waveguide material to permanently modify its effective refractive index, but merely shows that ablative removal of material as such is a known technique. However, that by itself does not suggest Applicant's claimed invention. Nothing in Brinkman discloses, suggests or motivates to one of ordinary skill in the art to permanently adjust the free spectral range of a resonant cavity of a laser device by monitoring the optical output during operation of the laser device and permanently modifying the effective refractive index of the intracavity waveguide segment of the laser device according to the free spectral range determined from the laser's monitored output. At best, Brinkman only discloses temporary index adjustments associated

with operation of optical switches. The rejections are believed to be traversed.

Applicant requests reconsideration of the claims in view of the remarks made herein. The claims are believed to be patentable over the cited art. A Notice of Allowance is earnestly solicited.

CERTIFICATE OF MAILING

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Asst. Commissioner for Patents, Washington, D.C. 20231

Signed: Sally Azevedo

Typed Name: Sally Azevedo

Date: October 22, 2001

Respectfully submitted,

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Version with Markings to Show Changes Made

SUMMARY OF THE INVENTION

According to the invention, a method for adjusting a resonant cavity uses an energy beam on an intracavity optical path and modifies an optical length until a free spectral range equals a rational fraction of a specified frequency interval. The specified interval may be the separation of DWDM channels in a telecommunications application. The energy beam may be an ultraviolet beam and the optical length may [by] be modified by a light induced refractive index change including a chemical alteration in the material such as crosslinking a polymer or changing the electronic environment of a dopant. The laser may be operated during adjustment to determine its free spectral range. The location of intracavity exposure may be changed during cavity adjustment. Alternative techniques include removal of intracavity material by laser ablation and deposition of intracavity material by evaporation using a mask for spatial definition. The laser cavity optical length may be designed to differ from the desired optical length by an amount that can be corrected by application of a single adjusting technique. Use of the energy beam may continue until a subset of longitudinal mode frequencies coincides with assigned frequency channels. The resonant cavity may be a laser containing an amplifier in the resonant cavity and coupled to an output waveguide so that the laser may be tuned to operate on one of the channels separated by the frequency interval[, or the resonator it may be coupled to an input waveguide containing multiple channels separated by a frequency interval with the resonator being tuned to couple to one

of the channels. To optimize the coupling between the resonator and the external waveguide, a method is described for impedance matching the resonator to the waveguide. While illuminating the resonator through an input waveguide, the throughput of the waveguide is monitored while adjusting one of the characteristics of the resonator such as the resonator loss or the coupling with the waveguide to achieve impedance matching where the throughput of the waveguide at the impedance matching frequency is minimized. Methods for modifying the resonator loss include ablating portions of a loss inducing absorber film, modifying the coupling with additional coupler elements, and inducing index of refraction changes in the waveguide. Methods for modifying the resonator coupling with the waveguide include irradiation for producing a chemical alteration, ablation, or material deposition or etching to change an effective index of refraction within the coupler].